# ZEYU (JERRY) WEI

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## RESEARCH INTERESTS

- Statistics: topological data analysis, nonparametric statistics, network analysis
- Machine Learning: cluster analysis, manifold learning

## EDUCATION

**University of Washington, Seattle** 09/2019 – Present
**Ph.D. Student**
Advisor: Yen-Chi Chen, Tyler H. McCormick

**University of Wisconsin – Madison** 09/2015-05/2019
**B.S.**
Major in Statistics (Honor), Math (Honor), and Sociology (Concentration in Analysis and Research); Certificate in Computer Science

## RELEVANT COURSEWORK

Data Visualization, Advanced Theory of Statistical Inference, Advanced Probability, Stochastic Modeling, Advanced Regression Methods, Statistical Learning Theory, Manifold Geometry
- Preliminary Exam: Sparse Subspace Clustering 06/2020
- Statistical Consulting: Project on mixed effect model 12/2020

## HONORS AND AWARDS

**Student & Early Career Travel Award** by American Statistical Association 2022
**Graduate Student Conference Presentation Award** by UW Graduate School 2022
**GPSS Travel Grant** by UW Graduate & Professional Student Senate 2022
**R. Creighton Buck Scholarship** 2019
Awarded to graduating math major who has completed the best capstone experience as determined by the awards committee in Department of Mathematics, University of Wisconsin-Madison
**Phi Beta Kappa Honors Society Member** 2018
inducted as Junior, 5%
**3rd place in Midwest Undergraduate Data Analysis Competition** 2017

## RESEARCH EXPERIENCE

**Department of Statistics University of Washington, Seattle** 09/2019-present
Ph.D. student
**Epidemic Model Failures under Missingness (In Progress)**
Advisors: Tyler McCormick (UW Stats), Arun Chandrasekhar (Stanford Econ), Paul Goldsmith-Pinkham (Yale)

- Analyzing the performance of Epidemic models under inaccurate graph with missingness
- Investigating how geometric properties of networks affect the impact of missingness.

**Skeleton Regression: A Graph-Based Approach to Estimation on Manifold**
Advisor: Yen-Chi Chen (UW Stats)

- Proposing a regression framework to deal with covariates lying around some manifold structures with noises
- R package at https://github.com/JerryBubble/skeletonMethods
- Manuscript in progress

**Skeleton Clustering: Dimension-Free Density-Aided Clustering**
Advisor: Yen-Chi Chen (UW Stats)

- Working on a clustering framework that can deal with large-scale high-dimensional data with fast computation
- Proposed new density-based similarity measure that avoids curse of dimensionality
- Manuscript at https://arxiv.org/abs/2104.10770https://arxiv.org/abs/2104.10770 and R package at https://github.com/JerryBubble/skeletonClus
- Visualizations at https://cse512-22sp.pages.cs.washington.edu/SkeletonVis/

**The Effects of Noise Exposure and Aging on the Acoustic Reflex in Normal-Hearing People**
Advisors: Ward R Drennan

- Applying Mixed Effects Models to identify potential indicators of subclinical hearing problems from experimental Audiology data
- Accepted for poster presentation at the 181st Meeting of the Acoustical Society of America
- Poster presentation at the 182nd Meeting of the Acoustical Society of America in Denver, Colorado on May 26, 2022.

**Undergrad Honor Thesis in Statistics** 07/2018-05/2019
Advisor: Zhengjun Zhang

- Modeling maxima series with Autoregressive Conditional Fréchet (AcF) Model, which incorporates dynamic components into generalized extreme value model
- Conduct data experiments on S&P 500 constituents with AR(1) and GARCH(1,1) filters

**Fields Undergraduate Summer Research Program** 07/2018-08/2018
Advisor: Mark Chignell

- Used cluster-boosted regression to improve predictions and deidentify confidential data
- Carried out Monte Carlo Simulation experiments to determine distributional properties that influence the boosting effect in cluster-boosted regression
- Drafted scientific report *Effectiveness of Cluster-Boosted Regression*

**UW Madison Summer School in Harmonic Analysis** 05/2018-07/2018
Advisor: Tess Anderson

- Paper published on *Mathematische Annalen*
- Generalized the notion of distinct dyadic system Provided classification criteria for distinct grids

**Wisconsin Policy Analysis Lab** 01/2018-05/2018
Advisor: Jason Fletcher

- Wrote report *Change in Distance to Nearest Abortion Facility in Wisconsin Change in Distance to Nearest Abortion Facility in Wisconsin, 2010 to 2017*

**National Council on Crime & Delinquency** 2017.05-2017.08
Data Analyst Intern

- Managed Oracle database and generated data analytics reports to help coordinate agencies working for child welfare and juvenile justice cases

- Worked on modularizing reports for system conversion

**Data Analyst at BerbeeWalsh Department of Emergency Medicine** 2017.02-2017.10
PI: Shah, Manish N.
- Performed database management for the study on *Paramedic Coached ED Care Transitions to Help Older Adults Maintain Their Health*

**Applied Demography Research** 2017.01-2017.05
Advisor: Katherine Curtis
- Conducted final project with the Applied Population Laboratory and wrote a report on *Health Insurance Coverage in Wisconsin*, analyzed at county level

## PUBLICATIONS

***Publications***
Anderson, T.C., Hu, B., Jiang, L., Olson, C., Wei, Z. *On the translates of general dyadic systems on R.* Math. Ann. 377, 911–933 (2020). https://doi.org/10.1007/s00208-019-01951-z

***Technical Reports***
Fletcher, J., Madden, J., Romell, E., & Wei, Z. (2018*). Change in Distance to Nearest Abortion Facility in Wisconsin Change in Distance to Nearest Abortion Facility in Wisconsin, 2010 to 2017.* http://www.lafollette.wisc.edu/research-public-service/publications

***Preprint***
- Wei, Z., Chen, Y. *Skeleton Clustering: Dimension-Free Density-based Clustering*, https://arxiv.org/abs/2104.10770https://arxiv.org/abs/2104.10770

## PRESENTATIONS

- *Skeleton Regression: A Graph-Based Approach to Estimation on Manifold*, 2022 Symposium on Data Science & Statistics, Jun 2022

-*Skeleton Clustering: Dimension-Free Density-Based Clustering*, JSM 2021, Aug 2021

-*Skeleton Clustering*, IFDS 2021 Summer School, July 2021

-*Skeleton Clustering*, UW Geometric Data Analysis Group, Feb 2021

-*Graph Laplacian and Linear Smoother*, UW Geometric Data Analysis Group, Feb 2020

-*Autoregressive Conditional Fréchet (AcF) Model*, Undergraduate Symposium at the University of Wisconsin-Madison, May 2019

-*On the translates of general dyadic systems on R*, Undergraduate Mathematics Symposium, University of Illinois at Chicago, November 2018

## TEACHING EXPERIENCE

**University of Washington, Seattle**
**Lead Tutor**, Department of Statistics 09/2021-Present
**Teaching Assistant**, Department of Statistics 09/2019-Present
-CSE 416: Introduction to Machine Learning (Spring 2022)

-STAT 390: Statistical Methods in Engineering and Science (with Caren Marzban, Fall 2020)
-STAT 221: Statistical Concepts and Methods for the Social Science (with William Brown, Summer 2020)
-STAT 220: Statistical Reasoning (with William Brown, Winter 2020)
-STAT 311: Elements of Statistical Methods (with Ranjini Grove, Fall 2019; with Tamre Cardoso, Spring 2020)

## SERVICES

**University of Washington**

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| -Organizer of the Geometric Data Analysis Reading Group, UW Statistics | 10/2021-present |
| -Lead Tutor, UW Statistics | 09/2021-present |
| -Mentor for Directed Reading Program Project**,** UW SPA | 12/2020-03/2021 |

**University of Wisconsin-Madison**

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|---|---|
| -Student Representative at Undergrad Statistics Committee, UW-Madison | 09/2017-05/2019 |
| -President of the Undergraduate Statistics Club, UW-Madison | 05/2018-05/2019 |
| -Executive of the Undergraduate Statistics Club, UW-Madison | 01/2017-05/2018 |

-Organizer of the first UW-Madison Data Science Challenge 2018

## COMPUTER SKILLS AND LANGUAGES

**Proficient** in R, Python, MATLAB, Excel
**Familiar** with Java, SQL, C++, Mathematica, Altair, Vega-Lite, D3.js

**Languages:** English, Chinese (native)